

**PATENT****IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Applicants: Keung, et al.

Examiner: Hai Vo

Serial No.: 09/666,928

Art Unit: 6748

Confirm. No.: 6748

Docket: 10188

Filed: September 21, 2000

For: HEAT-SEALABLE MULTI-LAYER  
WHITE OPAQUE FILMMail Stop Non-Fee Amendment  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450**DECLARATION UNDER 37 CFR 1.132**

Sir:

I, Robert A. Migliorini do hereby declare and state:

1. I am one of the inventors named in the above captioned patent application.
2. I have a bachelors degree in Chemical Engineering from Tufts University and a Masters degree in Materials Engineering and a Masters in Business Administration degree from Rochester Institute of Technology. Also, I have taken a number of courses relating to thermoplastic film technology.

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3. I have worked in the Films Division of ExxonMobil Chemical Corporation (formerly Mobil Oil Corporation) for more than sixteen (16) years and have held a variety of positions in the research and development and manufacturing groups. For the past three (3) years, I have worked in the manufacturing group and my current title is Plant Manager.

4. I have extensive knowledge in the development and manufacture of thermoplastic films and the polymeric materials and additives that are used to form such films.

5. I have read and understood the Office Action in the above-captioned case which was mailed on January 21, 2004. I also understand that the Examiner has found the pending claims to be unpatentable over U.S. Patent No. 5,691,043 to Keller et al. ("Keller" or "the '043 patent") in view of U.S. Patent No. 6,235,143 to Crighton et al. ("Crighton" or "the '143 patent") as evidenced by U.S. Patent No. 6,503,635 to Kong et al. ("Kong" or "the '635 patent"). The Examiner states that the bases for this finding is substantially set forth in the July 28, 2003 Office Action.

6. The July 28, 2003 Office Action referred to by the Examiner found the core layer of the films of the present invention to be obvious in view of the Keller patent and states at page 2 that, "Keller discloses the core layer comprising polypropylene homopolymer and 4 to 8 wt%

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PBT as a cavitating agent column 4, line 48, column 7, lines 17-18." However, Keller also discloses that the polypropylene homopolymer must be "sufficiently atactic" (col. 4, line 49) and that when an isotactic polypropylene is used, modifiers must be added to reduce the isotacticity (col. 4, lines 52-56). The core layers of the films of the present invention include "polypropylene homopolymer of high stereo-regularity" that is, isotactic polypropylene, which is inherently different from the atactic polypropylene taught by Keller.

7. I have reviewed the '043 patent to Keller and find that Keller teaches that the films of the '043 patent require core layers containing polypropylene that is "sufficiently atactic" (col. 4, line 49) in order to achieve high shrinkages. An atactic polypropylene is a polypropylene that has no regularly repeating structural units such that the methyl groups are positioned randomly on both sides of the polymer backbone. In contrast, the isotactic polypropylene used in the films of the present invention has regularly repeating structural units such that the methyl groups are on the same side of the polymer backbone. When an isotactic polypropylene is used in the films of the '043 patent, Keller teaches that it is necessary to add a modifier to the core layer to lower the isotacticity. See col. 4, lines 41-56.

The composition of the polypropylene-containing core layer of the multilayer film of the present invention must provide sufficient operability so that the film after biaxial orientation exhibits crystallinity which is low enough to permit the secondary orientation of the film, which imparts the uniaxial shrinkability to the film, without tearing. The core layer material can be a single polypropylene

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homopolymer material which is sufficiently atactic and which has a specific melting point, as determined by the DSC (Differential Scanning Calorimetry) method, e.g., at a heating rate of 2° C./minute. Alternately, the core layer material can comprise a blend of a more isotactic polypropylene with modifiers which are polyolefin materials which are less crystallizable due to a higher degree of chain imperfections or lower isotacticity.

Keller requires the addition of a modifier to the polypropylene in order to break up the regularly repeating structural units of the isotactic polypropylene backbone. This results in less efficient packing of the polypropylene chains and lower crystallinity. The disruption of the crystallinity of the isotactic polypropylene in the core layer yields a film that can be stretched in a second machine direction ("MD") stretching process following the transverse direction stretching process. One of ordinary skill in the art would recognize that the addition of a modifier to change the stereo regularity of an isotactic polypropylene results in a significant change in the properties and processing characteristics of the polypropylene.

8. Isotactic polypropylene and atactic polypropylene have quite different properties and, when they are used in films, they produce films with substantially different characteristics. This contrast is clearly illustrated when the films of the present invention are compared to the films disclosed by Keller. Keller uses an atactic polypropylene which allows the films to be highly oriented in order to provide high shrinkages. In contrast, the high stereo regularity of the isotactic polypropylene used in the films of the present invention have a comparatively low

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shrinkage. In my Declaration submitted with the Supplemental Amendment filed on February 25, 2003, I provided data at paragraphs 7, 8 and 13 which showed that the films of the present invention have a low shrinkage compared to the Keller films.

9. The Keller patent requires an atactic polypropylene in the core layer in order to produce a film with high shrinkage. Films made from atactic polypropylene, or from blends of isotactic polypropylene and a polyolefinic modifier to lower the crystallinity, can undergo a higher degree of orientation than the films of the present invention, which are made from isotactic polypropylenes and which tend to break when oriented to a high degree, particularly during a secondary machine direction stretching process such as the one disclosed in Keller. The atactic polypropylene, or modified isotactic polypropylene, are not suitable for use in the core layer of our low shrinkage films because the tensile properties and stiffness would be lowered, the hot slip would increase, and the dimensional stability would be poorer. Each of these properties is critical in the design of a film that will have acceptable high speed packaging machine performance on multilane packaging machines. Moreover, the films of the present invention are intended for use in vertical fill form and seal applications, which require good hot tack properties. However, the incorporation of atactic polypropylene, or modified isotactic polypropylene in the core layer would result in poorer hot tack. The specification clearly points out the importance of these properties and states that, "the present invention provides a

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multilayer white opaque plastic film heat-sealable on one or two sides, with *improved hot tack* and . . . *good hot slip properties*." (Page 3, lines 18-21.) In order to produce a film with such properties, a highly isotactic polypropylene must be used in the core layer. See also, paragraphs 15 and 16 of this declaration for more details regarding packaging machine performance.

10. In my opinion, the atactic polypropylene and blends of isotactic polypropylene and polymeric modifier used in the core layer of the Keller films is significantly different from the "polypropylene homopolymer of high stereo-regularity" used in the core layers of the films of the present application. For example, the heat shrinkable films disclosed by Keller are intended to be used in packaging applications where it is desirable to have the film fit tightly around a product. Keller discloses at col. 1, lines 20-35 that:

A shrink film's distinguishing characteristic is its ability upon exposure to some level of heat to shrink or, if restrained, to create shrink tension within the film. This ability is activated by the packager when the wrapped product is passed through a hot air or hot water shrink tunnel. The resulting shrinkage of the film results in an aesthetically pleasing transparent wrapping which conforms to the contour of the product while providing the usual functions required of packaging materials such as protection of the product from loss of components, pilferage, or damage due to handling and shipment. Typical items wrapped in polyolefin shrink films are toys, games, sporting goods, stationery, greeting cards, hardware and household products, office supplies and forms, foods, phonograph records, and industrial parts.

11. Keller goes on to describe at col. 1, lines 51-67 the intended use of the films of the

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'043 patent and the specific types of products that are packaged using the films:

Certain applications, e.g., labelling, covering, or packaging of materials such as boxes, plates, vessels, bottles, tubes, cylindrical material, e.g., pipes, and rods, etc. are especially susceptible to covering with heat shrinkable films. However, in certain situations it is desirable to effect shrinkage along a single axis without substantial shrinkage in the cross-direction. For example, in the process of labelling bottles by shrinking a tube of heat shrinkable material, if the film shrinks along its length, the label may not be placed in the right position but rather placed at above the desired position upon shrinkage. Moreover, printing and other conversion processes of such label surfaces require heat stability in substantially one direction to meet machinability requirements. Uniaxially shrinkable materials can also be used in preparing tightly wrapped containers by lap heat sealing uniaxially shrinkable film resulting in shrink down of the wrapping.

12. One of ordinary skill in the art of plastic film technology would recognize from the Keller's teachings that the '043 patent pertains to films with high shrinkage in the machine direction. At col. 10, lines 6-10, Keller discloses that the films of the '043 patent can have machine direction shrinkages in excess of 25%.

The resulting uniaxially shrinkable film after secondary orientation exhibits at temperatures of 100° to 145° C., say, 135° C., greater than 15%, preferably greater than 18%, 20%, or even greater than 25% shrinkage in the direction of secondary orientation, e.g., machine direction.

13. When the films of the Keller patent are used in packaging applications, the high shrinkages allow the films to fit tightly around the product. Accordingly, one of ordinary skill in

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the art of packaging films would not use the Keller films to package products that would be damaged by the forces exerted by a high shrinkage film. Moreover, one of ordinary skill in the art would recognize that it may not be possible to run high shrinkage films on packaging machines designed for low shrinkage films.

14. The films of the present invention are used to package products such as frozen novelties, including ice cream bars and ice cream sandwiches. See specification, p. 1, lines 13-14. One of ordinary skill in the art would recognize that the films of the present invention are used in applications that are quite different from the high shrinkage film applications disclosed by Keller. The films of the present invention are not intended to fit tightly around a product and they are not intended to be used as heat shrinkable films. Accordingly, the core layers contain polypropylene homopolymer of high stereo-regularity which allows the films to be oriented and yet still have minimum shrinkage.

15. In my opinion, the MD shrink properties of the Keller films would cause significant machining issues if used in packaging applications as a substitute for the films of the present invention. For example, in a multilane ice novelty packaging application, a film made in accordance with the Keller patent would primarily have problems as it passes through the fin seal assembly. The fin seal assembly is typically an inverted sealing mechanism which uses a



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serpentine/s-curve brass assembly and relies on directing the film surfaces to contact one side of the assembly and then the opposite side. These fin assemblies are usually set at fairly high temperatures due to the lack of pressure exerted.

16. In my opinion, a high shrinkage film, such as the films disclosed by Keller, would experience MD shrinkage (as they are designed to do) when subjected to the high temperatures of the fin assemblies, causing the film to bunch up in the fin assembly and resulting in a film jam at that point. The shrinkage of the Keller film at the fin sealing temperatures would also likely cause the film to pull out of the inverted sealing mechanism, causing package mis-wraps, mis-feeds and unsealed packages; and hence basically taking the packaging line down and making it inoperable. Additionally, once the Keller film was exposed to the crimp seal assembly, it would experience a degree of MD shrink which would cause issues with package puncture. I would expect an unacceptably high number of the ice cream novelty products, for example chocolate éclair bars, to have the sticks pushing through the newly formed crimp seal.

17. In my experience, packaging films are designed for specific applications and packaging machines. High shrinkage films, such as those disclosed by Keller, are designed for packaging applications where the films are subjected to heat at carefully selected points of the packaging process, for example through the use of a shrink tunnel. Moreover, when designing a

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high shrinkage film packaging process, it is important to maintain the temperature of the film below a threshold level until the films are shrunk. Otherwise, the film will shrink too soon and either mis-feed or jam in the packaging machine. Accordingly, one of ordinary skill in the art of packaging films would not substitute a high shrinkage film for use in a packaging machine designed for a low shrinkage film. As discussed above, the Keller films would likely shrink when they were not supposed to and cause numerous problems in the operation of the packaging machines if they were used as a substitute for the films of the present invention.

18. At page 4 of the July 28, 2003 Office Action, the Examiner states that:

It [is] not seen that the film of Keller would have performed differently from the film of the claimed invention....Products of identical chemical composition can not have mutually exclusive properties.

I disagree with this statement and this conclusion for the reasons set forth above. One of ordinary skill in the art would appreciate that the performance of a high shrinkage film is significantly different from the performance of a low shrinkage film. Moreover, the polypropylene in the core layer of the Keller film and the polypropylene in the core layer of the films of the present invention do not have an identical chemical composition. Keller makes this quite clear by requiring isotactic polypropylenes to be modified (col. 4, lines 52-56) before being used in the films of the '043 patent. Keller's "modification" is required in order to disrupt the

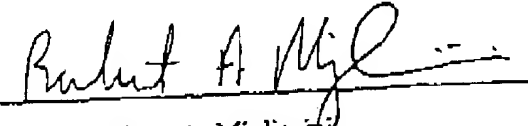
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patent. Keller's "modification" is required in order to disrupt the crystallinity of the isotactic polypropylene so that it can be used to form a high MD shrinkage film. From Keller's teachings, one of ordinary skill in the art would understand that the polypropylene homopolymer of high stereo-regularity used in the core layer of the films of the present invention has different properties and is chemically distinct from the atactic polypropylene and modified isotactic polypropylene used by Keller.

19. I hereby declare that all statements made herein are of my own knowledge and are true, and that all statements made on information and belief are believed to be true; and further that the statements have been made with the knowledge that wilful false statements and the like so made are punishable by fine or imprisonment, or both, under § 1001 of Title 18 of the United States Code and that such wilful false statements may jeopardize the validity of any patent issuing on the present invention.

Dated: March 19, 2004

  
Robert A. Migliorini

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